Integrating the UBCWM into a River Forecast System

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Presented to the CRWMG May 24, 2001

BC hydro

Summary

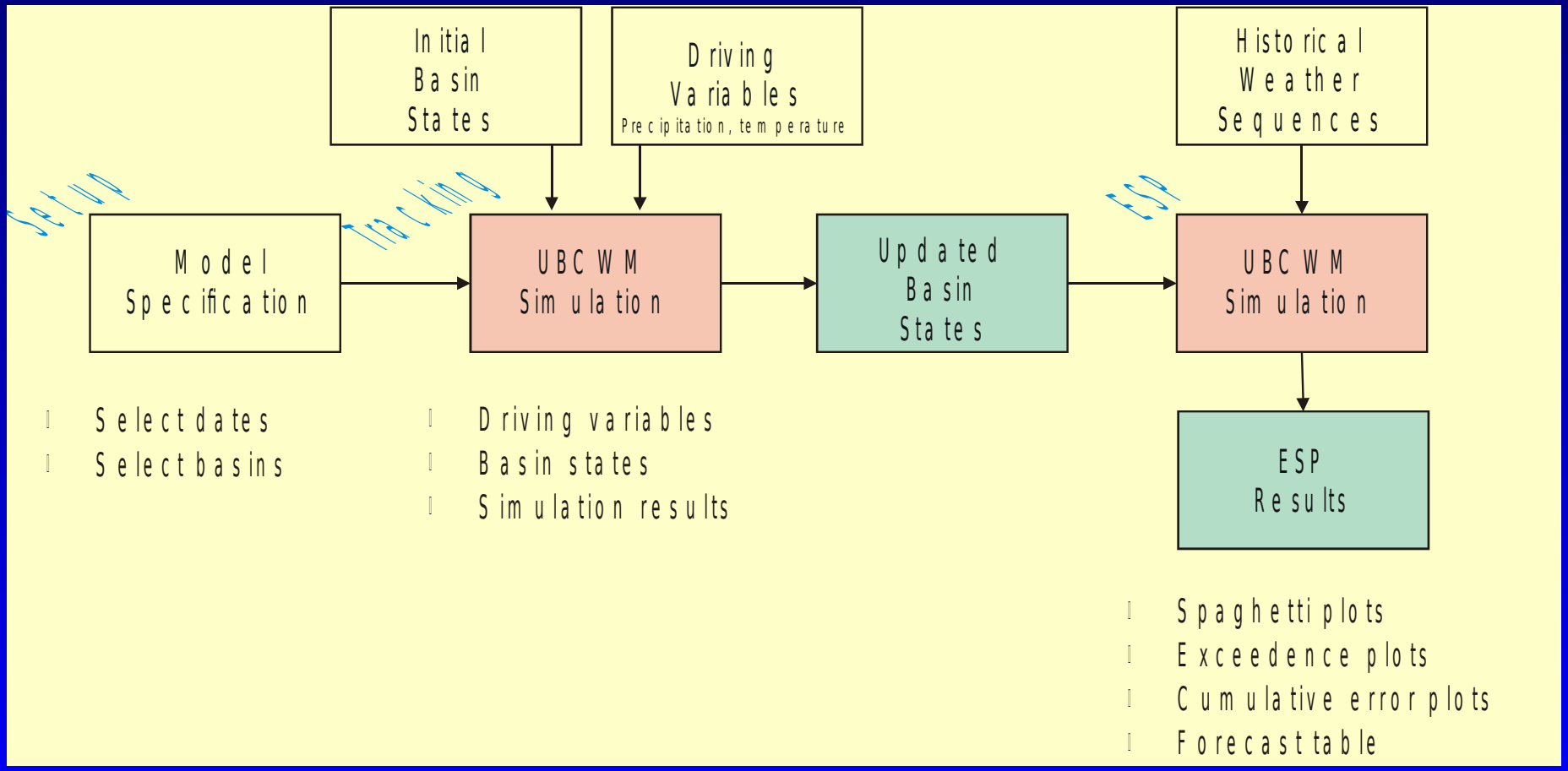
- **Design of the RFS**
- **Example screen shots for ESP forecasting component**
  - **Assumption: You know what ESP forecasting is**

Procedures used

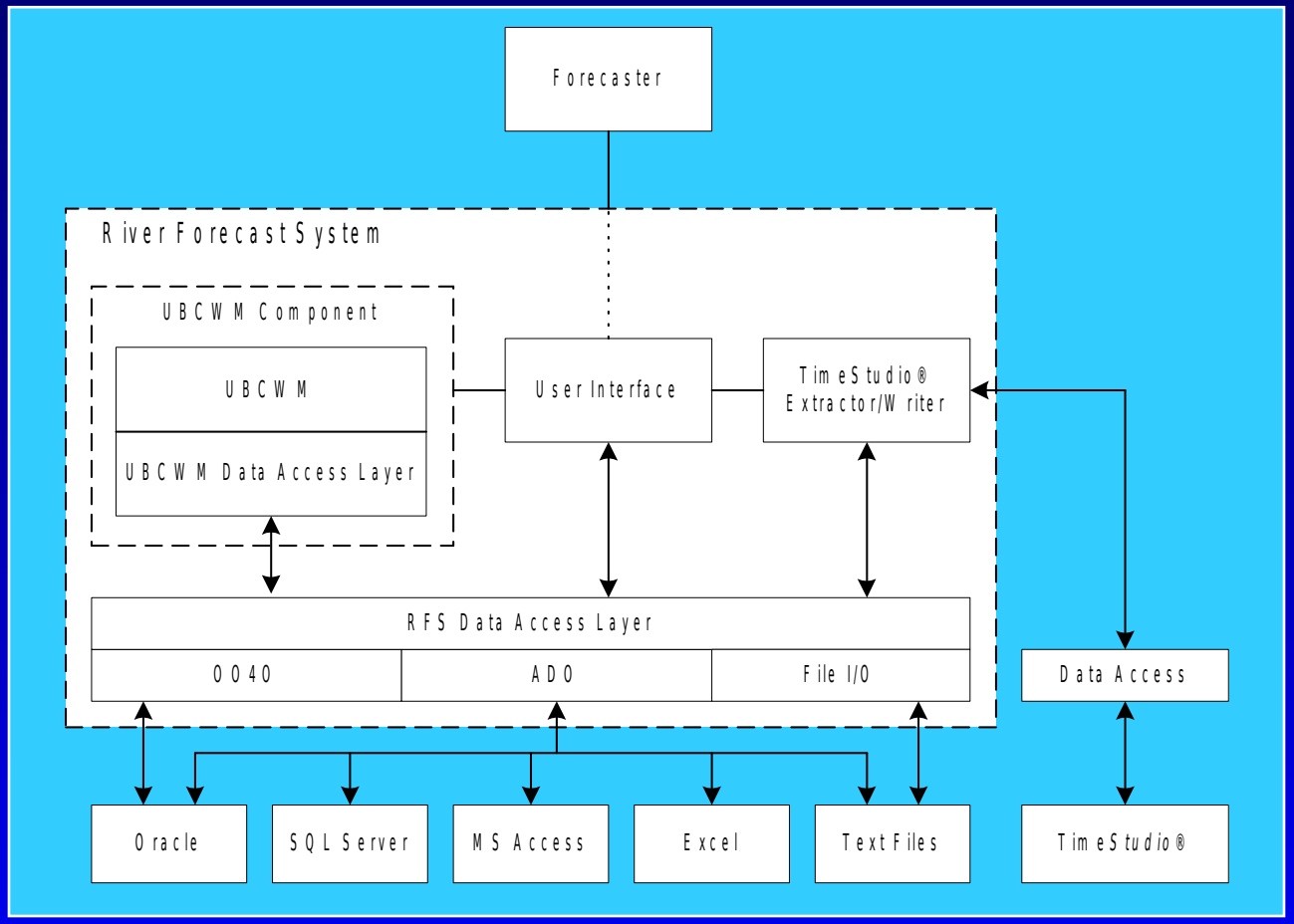
- **Seasonal**
  - *statistical (VOLCAST)*
  - **ESP using the a conceptual watershed model**
    - **UBCWM currently used by BC Hydro**

- Daily
  - conceptual watershed models
    - FLOCAST currently used
    - UBCWM will be used in the future

Seasonal ESP forecasting procedure



RFS general architecture

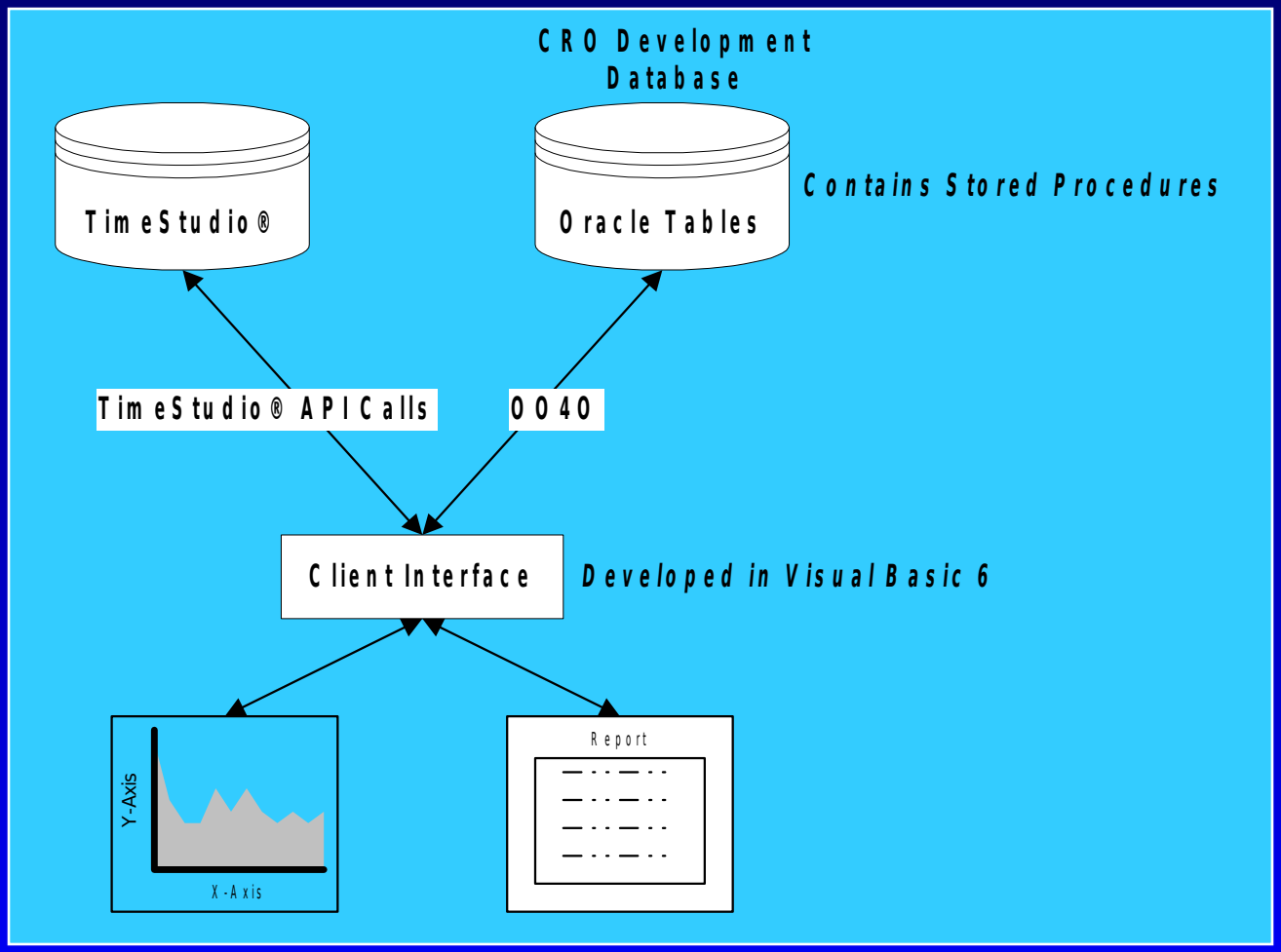


Component-bas
design

Theoretically,
could plug in
another “engin

Not constraine
to any one
data base

BC Hydro implementation of the RFS



TimeStudio ®

Application Program Interface

Oracle

Oracle Objects for OLE

Visual Basic 6

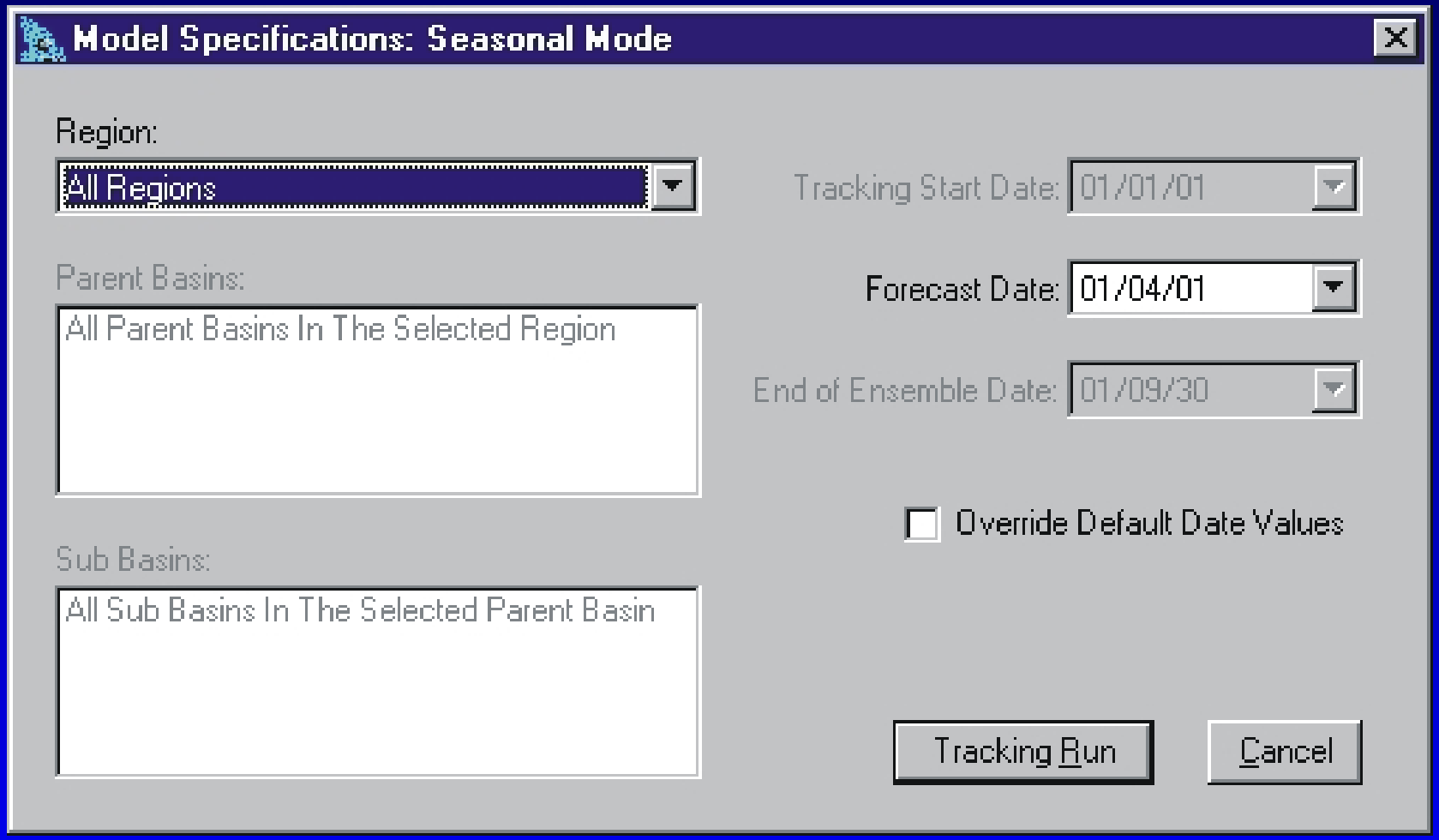
Logging on to the RFS

RFS Main menu

Setting up a forecast run

Tracking run

ESP Run

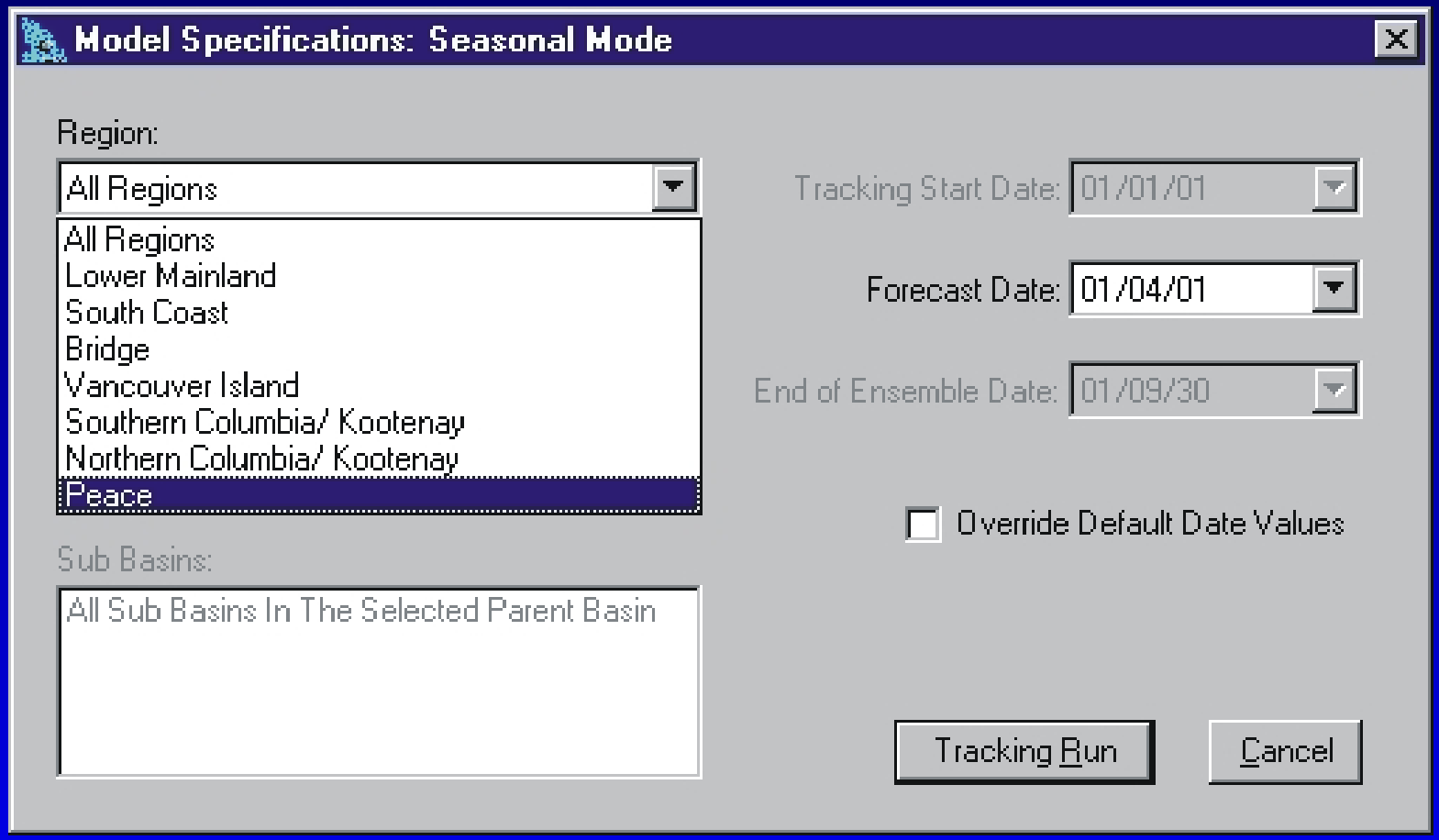


Model specifications

Setting up a forecast run

Tracking run

ESP Run



Select a region in which to forecast

Setting up a forecast run

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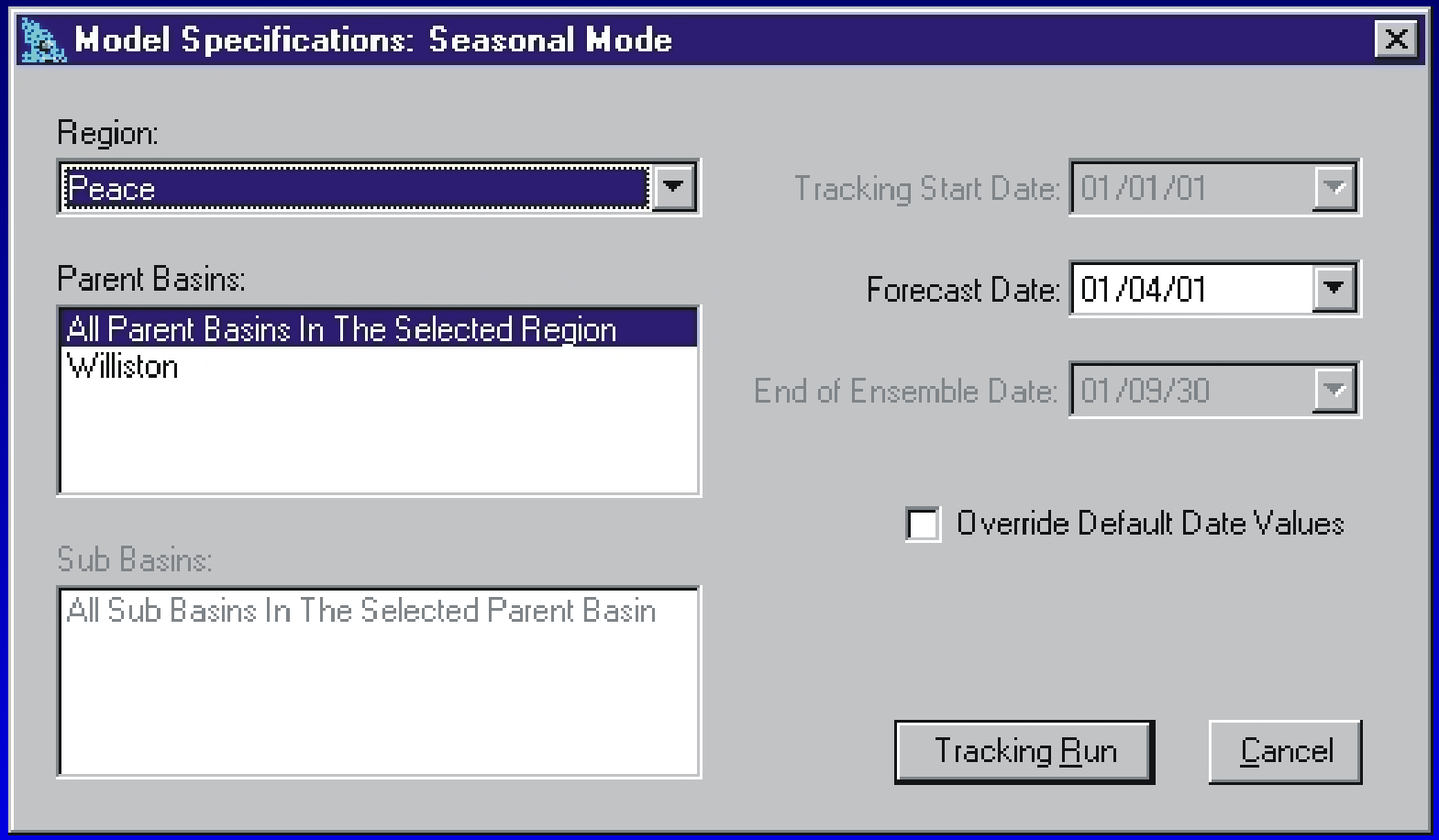
ESP Run



Select all or one of the basins to foreca

Setting up a forecast run

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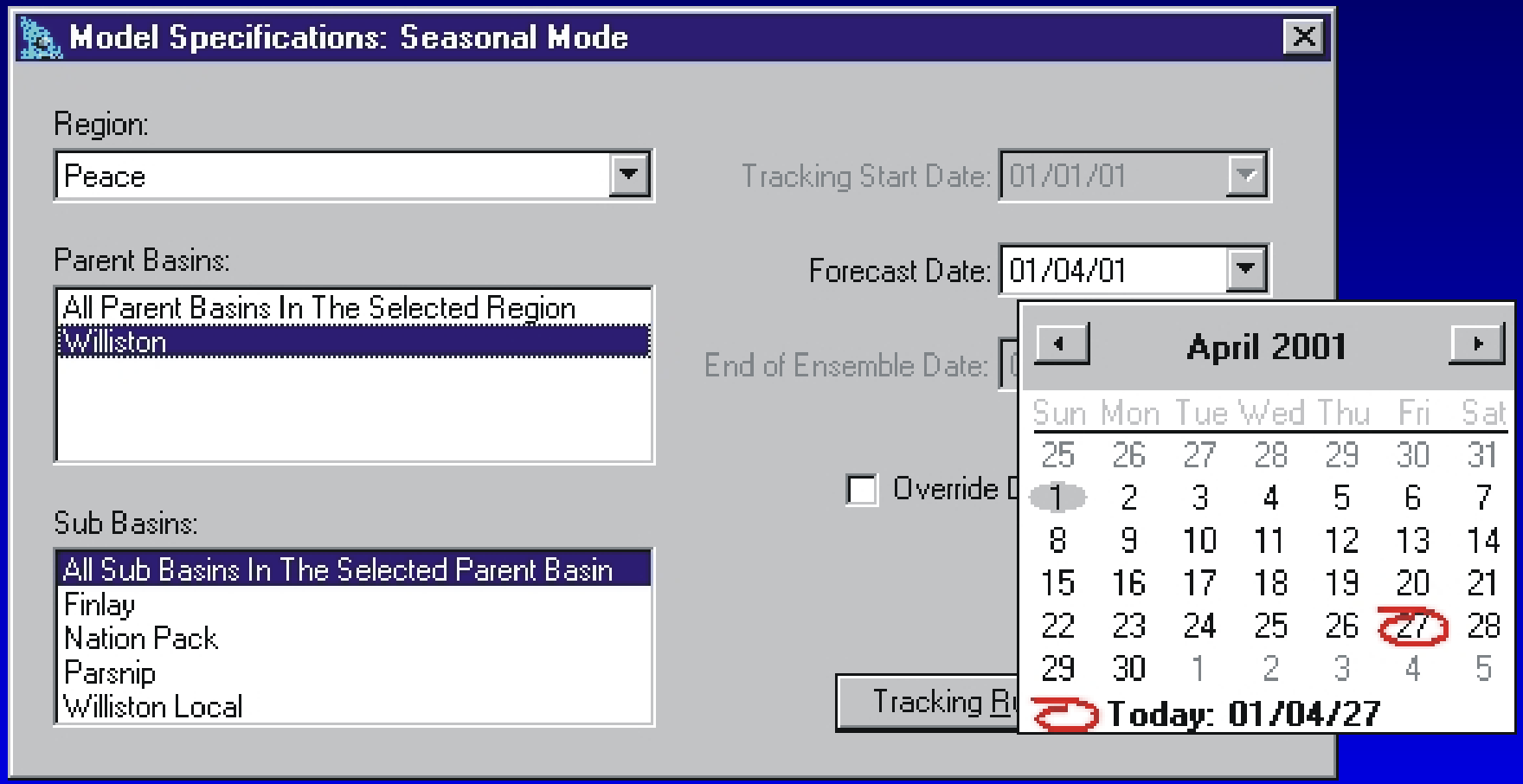
ESP Run



Select the forecast date from which to run the ESP sc

Setting up a forecast run

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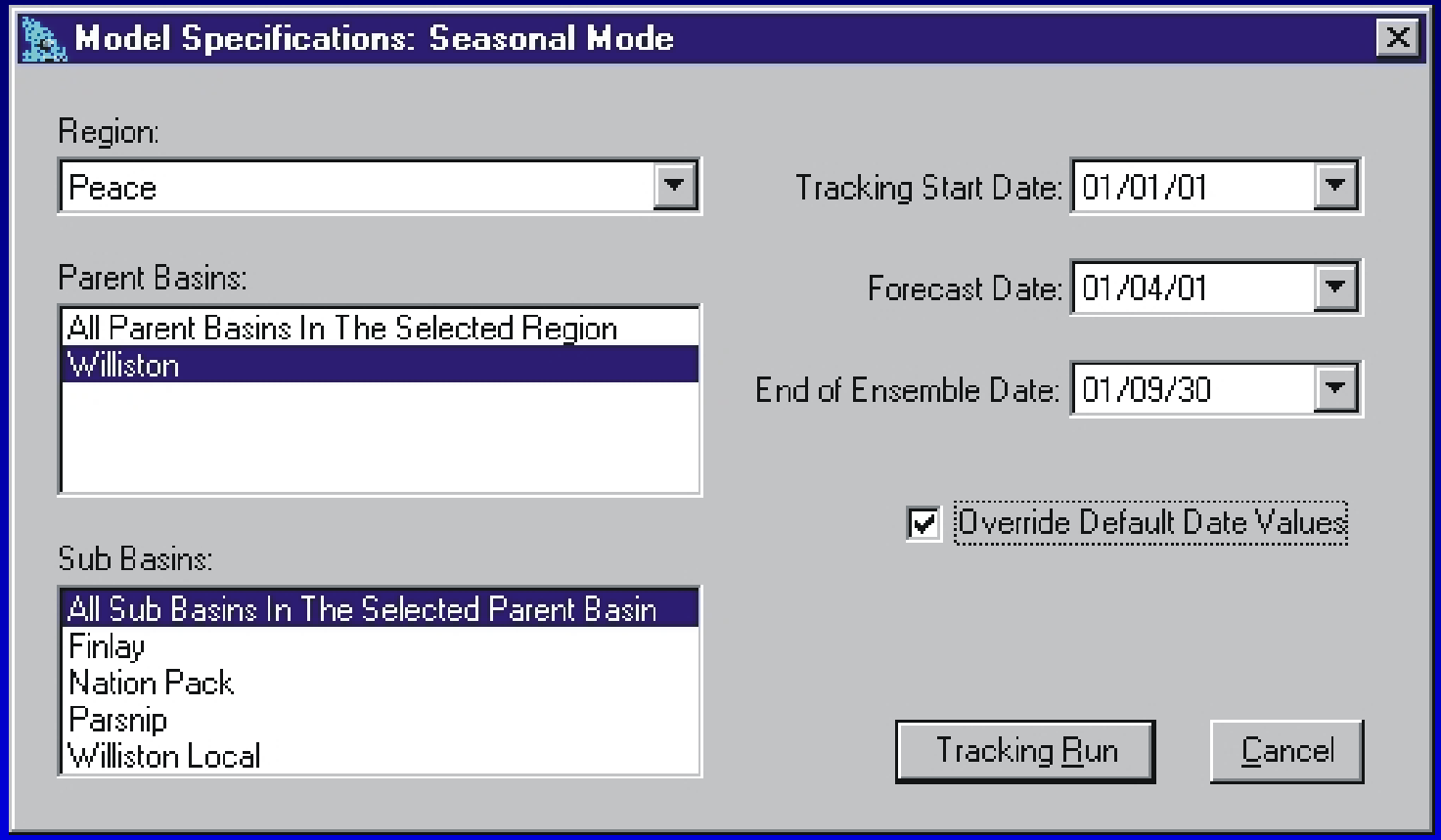
ESP Run



Override default dates *(optional)*

- start-of-the-tracking-run date
- end-of-the-ensemble-run date

Setting up a forecast run

Tracking run

ESP Run

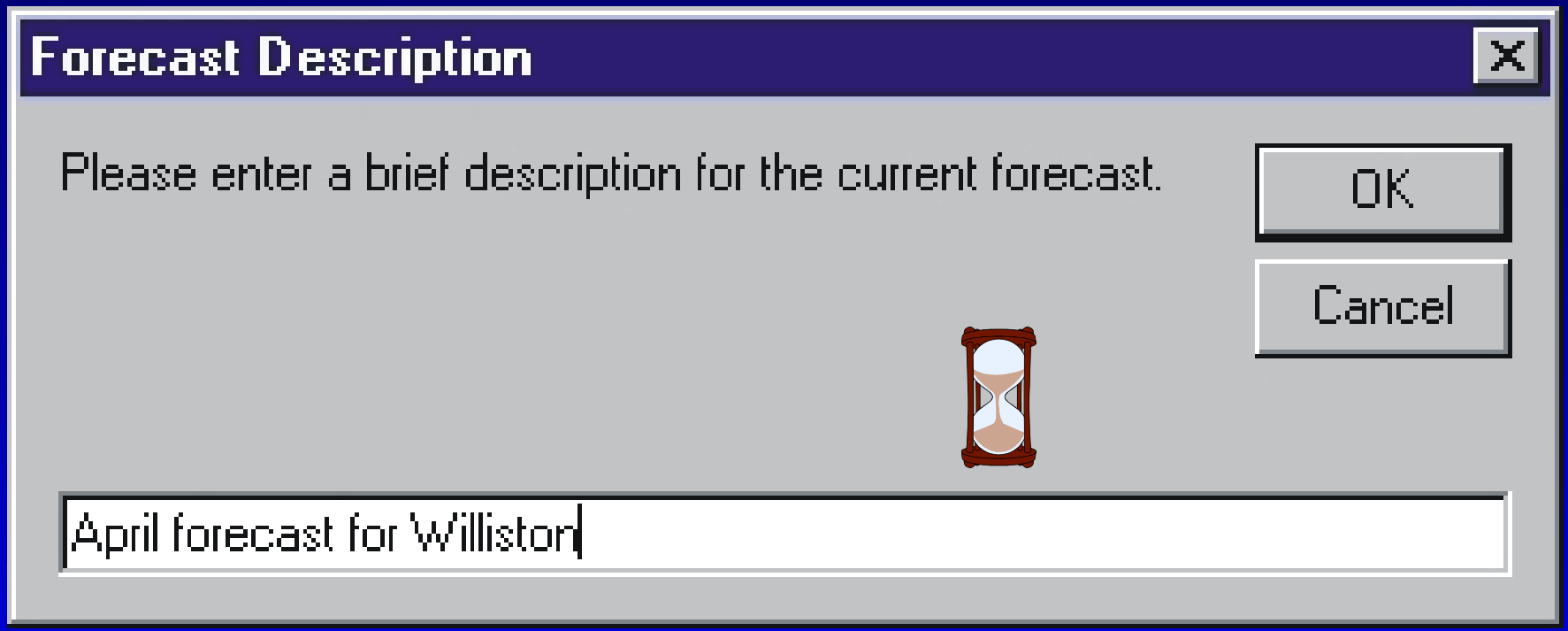
RFS assumes driving variable time series are available

Run the UBC Watershed Mode

Setting up a forecast run

Tracking run

ESP Run



Description of the run being made (*d*

Setting up a forecast run

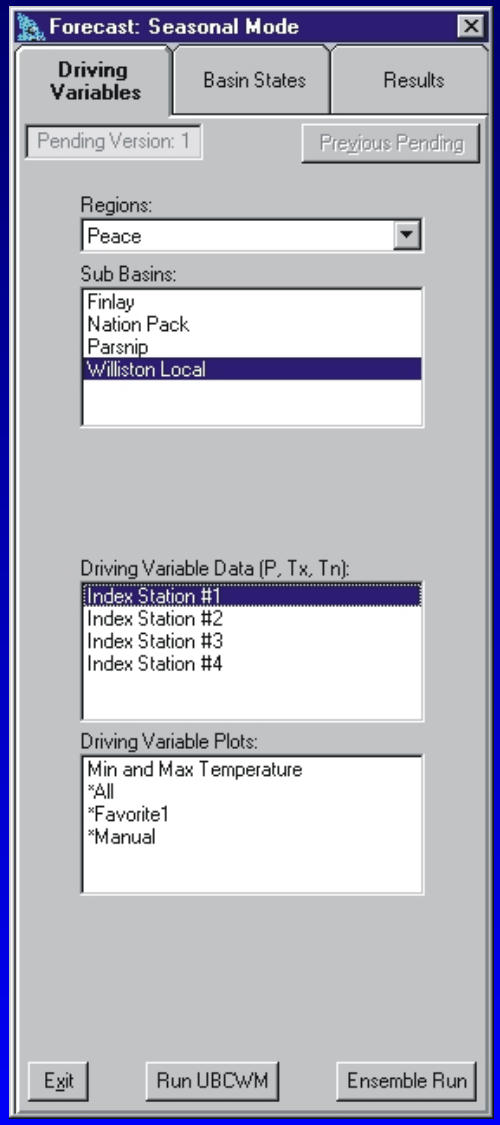
Tracking run

ESP Run

Driving variables

Basin states

Flow components



Review input driving variab

Finlay - Index Station #1

Date	Precipitation	Min Temp	Max Temp
01-Jan-2001	1.3	-6.2	-1.1
02-Jan-2001	4.3	-4.1	2.2
03-Jan-2001	0.8	-2.3	3.9
04-Jan-2001	0.2	-6.4	-0.9
05-Jan-2001	0.8	-4.0	2.0
06-Jan-2001	0.8	-8.1	-1.7
07-Jan-2001	0.8	-15.3	-6.3
08-Jan-2001	0.0	-13.7	-3.3
09-Jan-2001	2.0	-12.2	-2.3
10-Jan-2001	3.8	-7.7	-0.7
11-Jan-2001	1.5	-15.1	-4.3
12-Jan-2001	0.0	-26.8	-14.0
13-Jan-2001	0.0	-26.1	-15.1
14-Jan-2001	0.0	-25.1	-15.0
15-Jan-2001	0.0	-25.1	-15.0
16-Jan-2001	0.3	-15.3	-7.6

OK Cancel Apply

Tabular output of driving variables

Setting up a forecast run

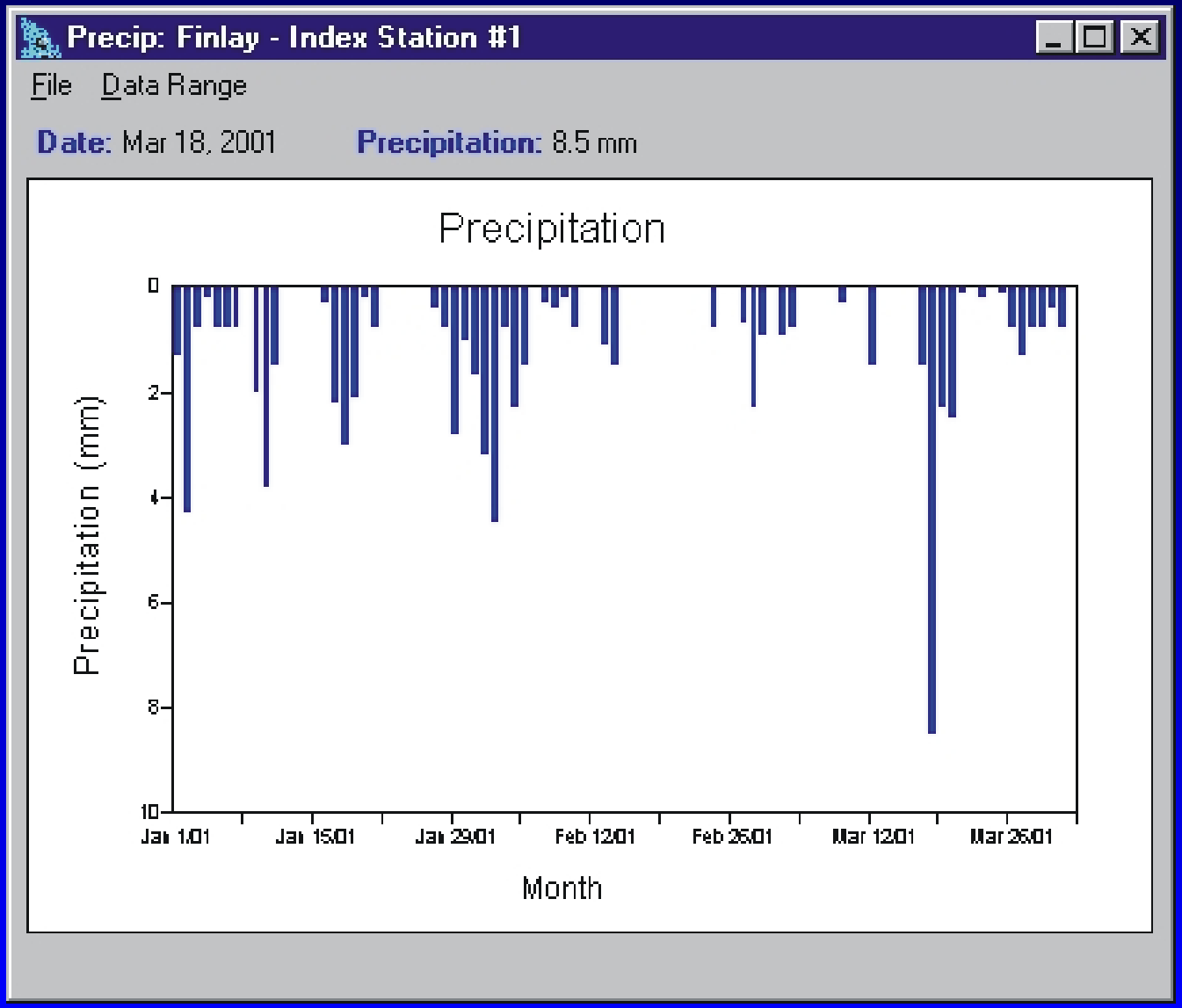
Tracking run

ESP Run

Driving variables

Basin states

Flow components



Graphical output of driving variables

Setting up a forecast run

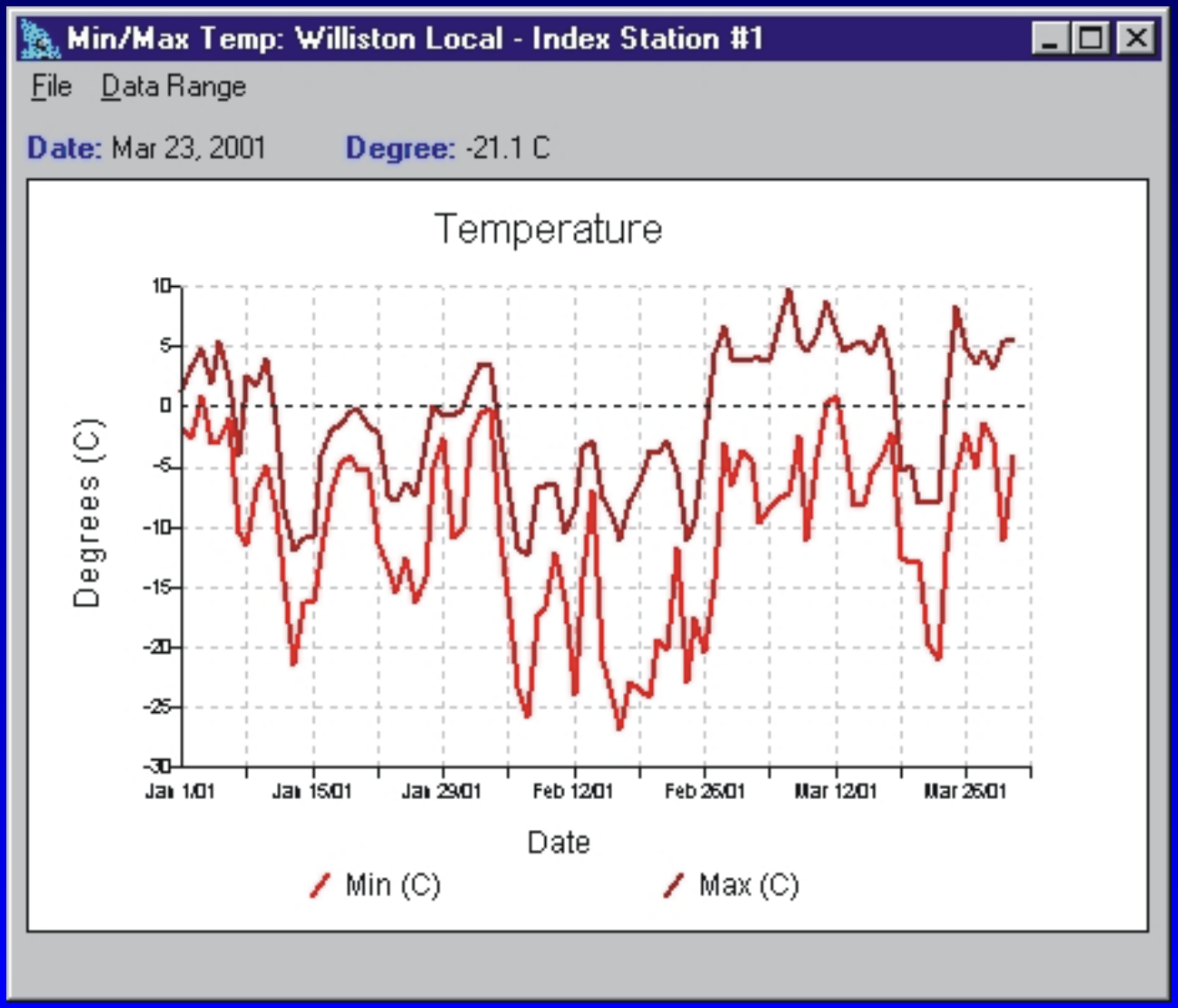
Tracking run

ESP Run

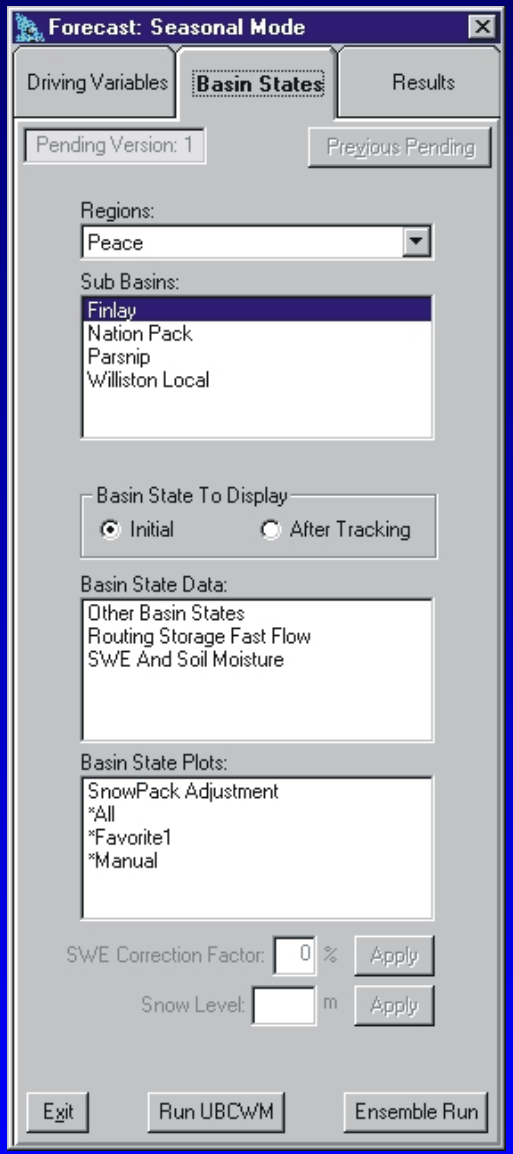
Driving variables

Basin states

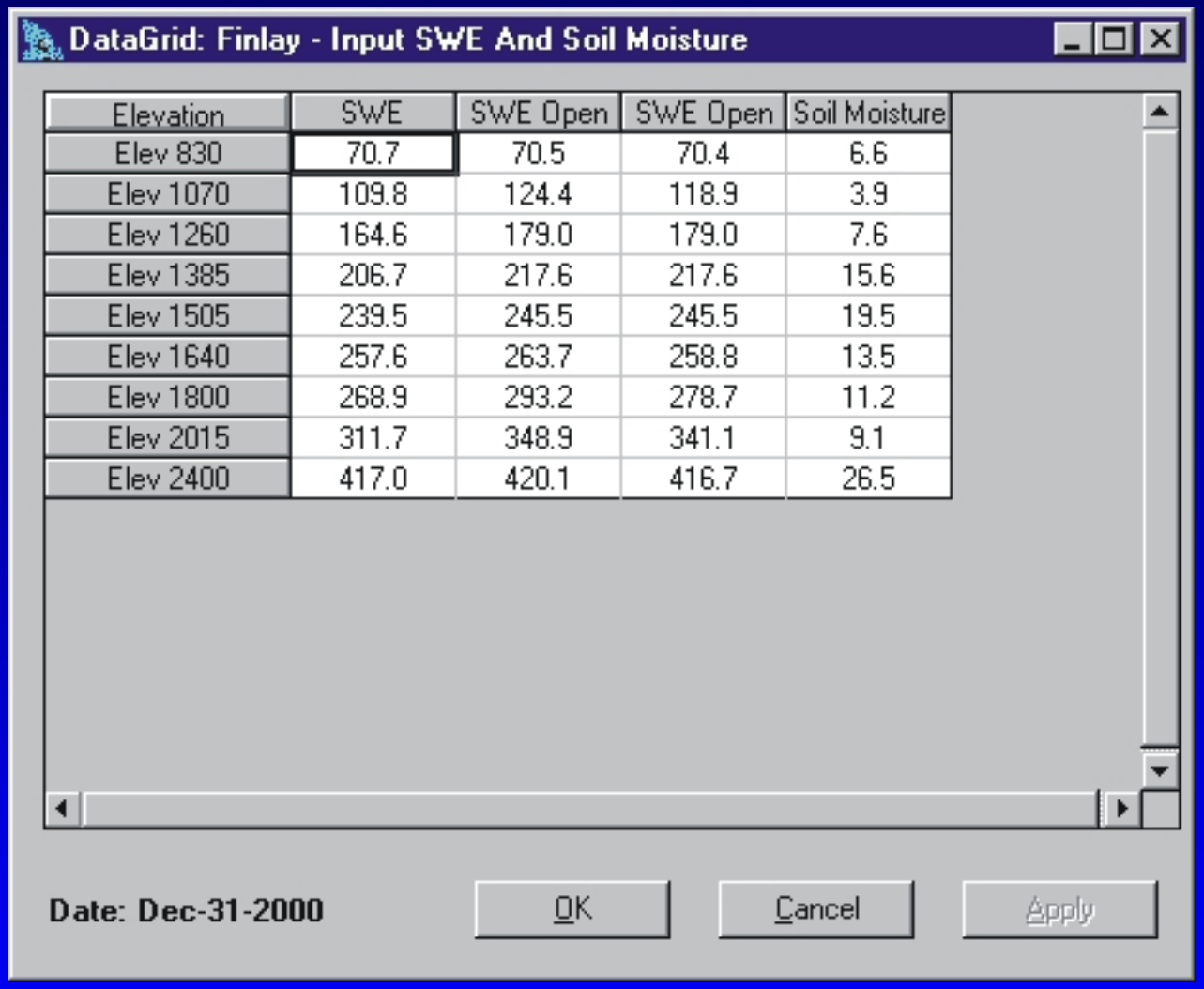
Flow components



Graphical output of driving variables



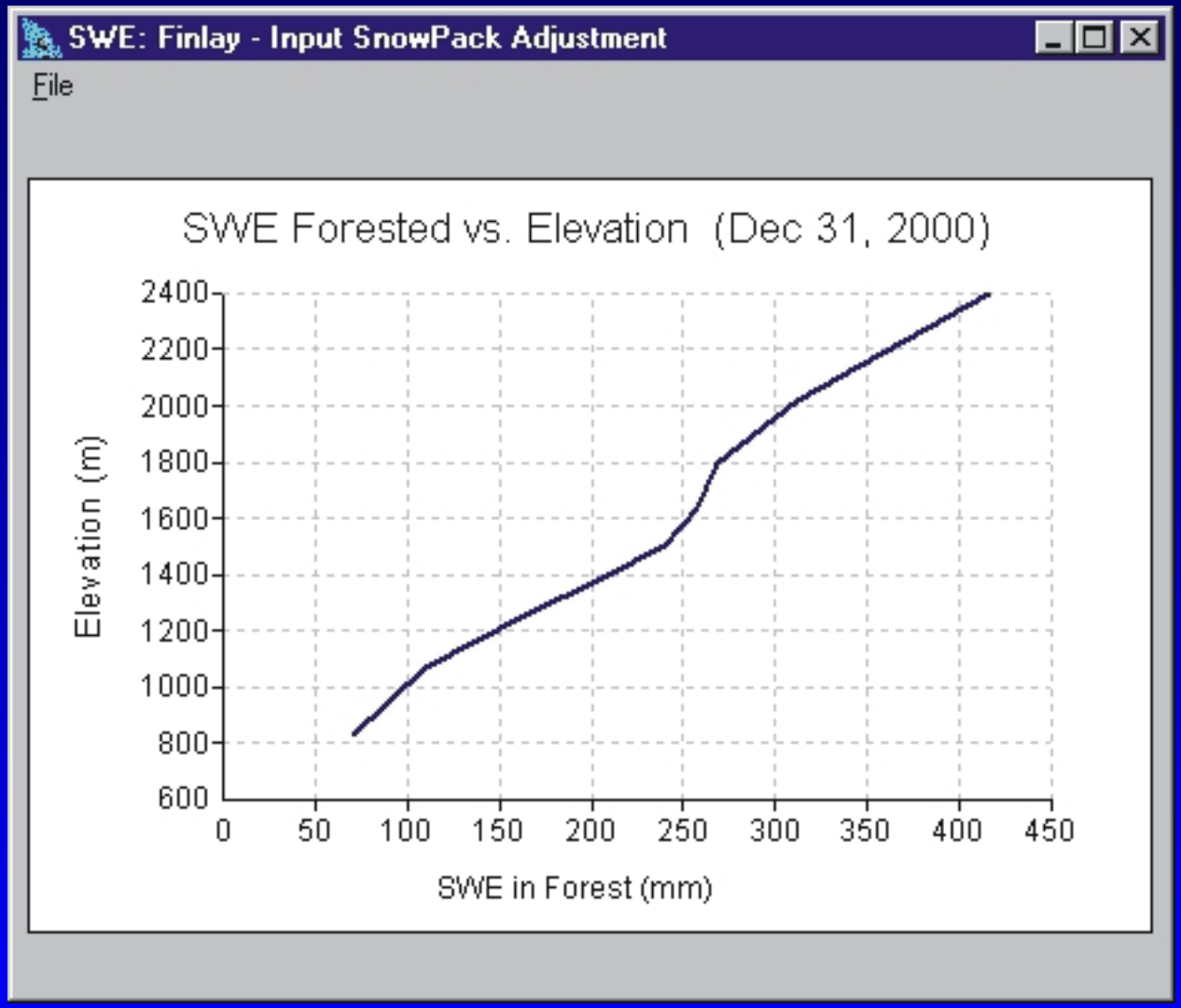
Review basin states before and after the tracking perio



Elevation	SWE	SWE Open	SWE Open	Soil Moisture
Elev 830	70.7	70.5	70.4	6.6
Elev 1070	109.8	124.4	118.9	3.9
Elev 1260	164.6	179.0	179.0	7.6
Elev 1385	206.7	217.6	217.6	15.6
Elev 1505	239.5	245.5	245.5	19.5
Elev 1640	257.6	263.7	258.8	13.5
Elev 1800	268.9	293.2	278.7	11.2
Elev 2015	311.7	348.9	341.1	9.1
Elev 2400	417.0	420.1	416.7	26.5

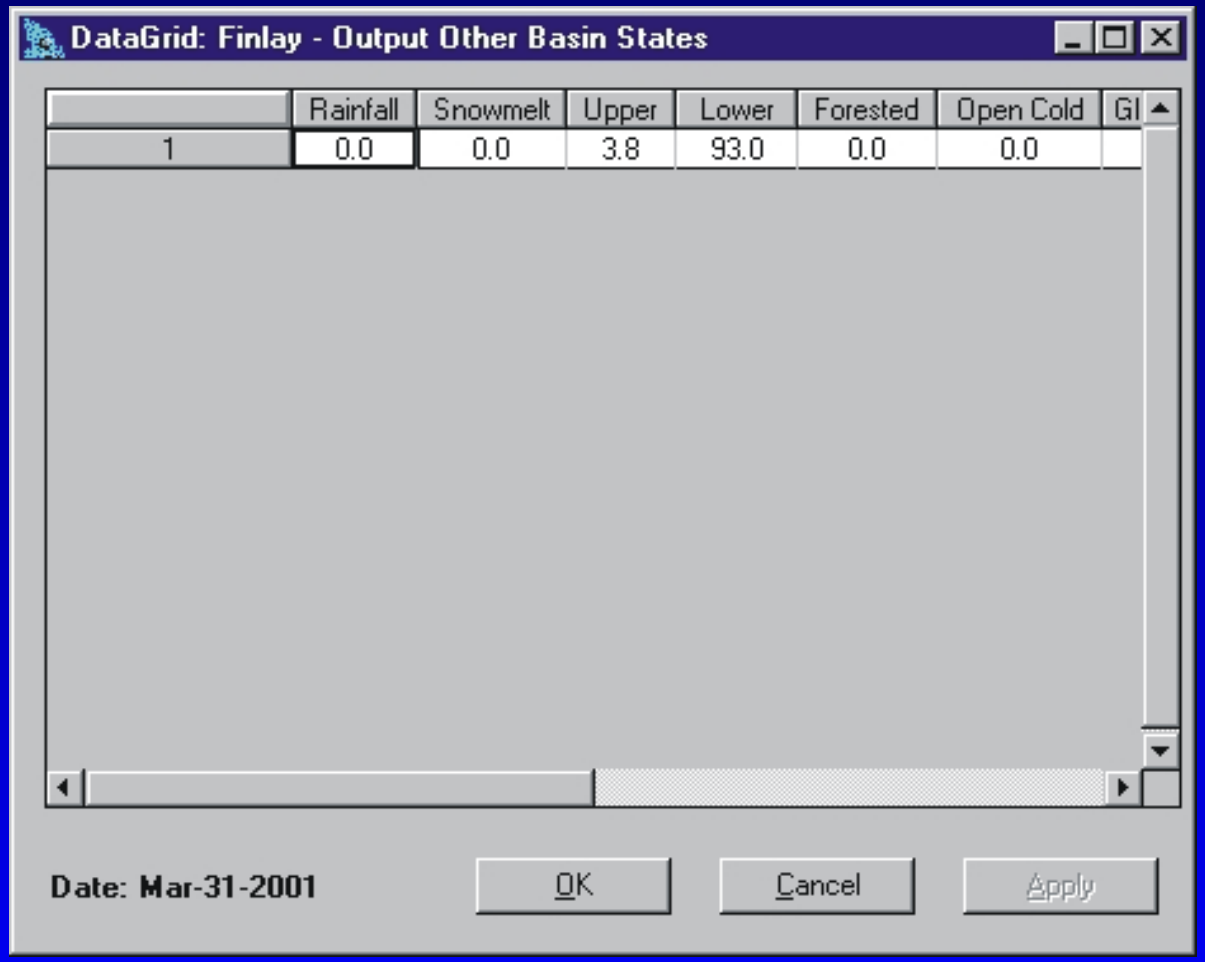
Table of

SWE
and
soil moisture
by elevation band



Graph of

SWE
and
soil moisture
by elevation band



Other basin state

Setting up a forecast run

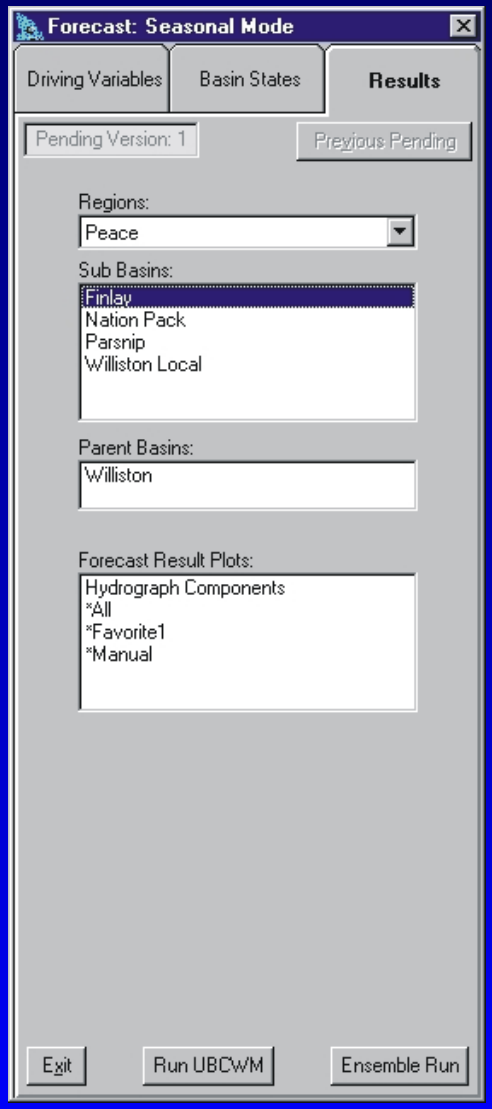
Tracking run

ESP Run

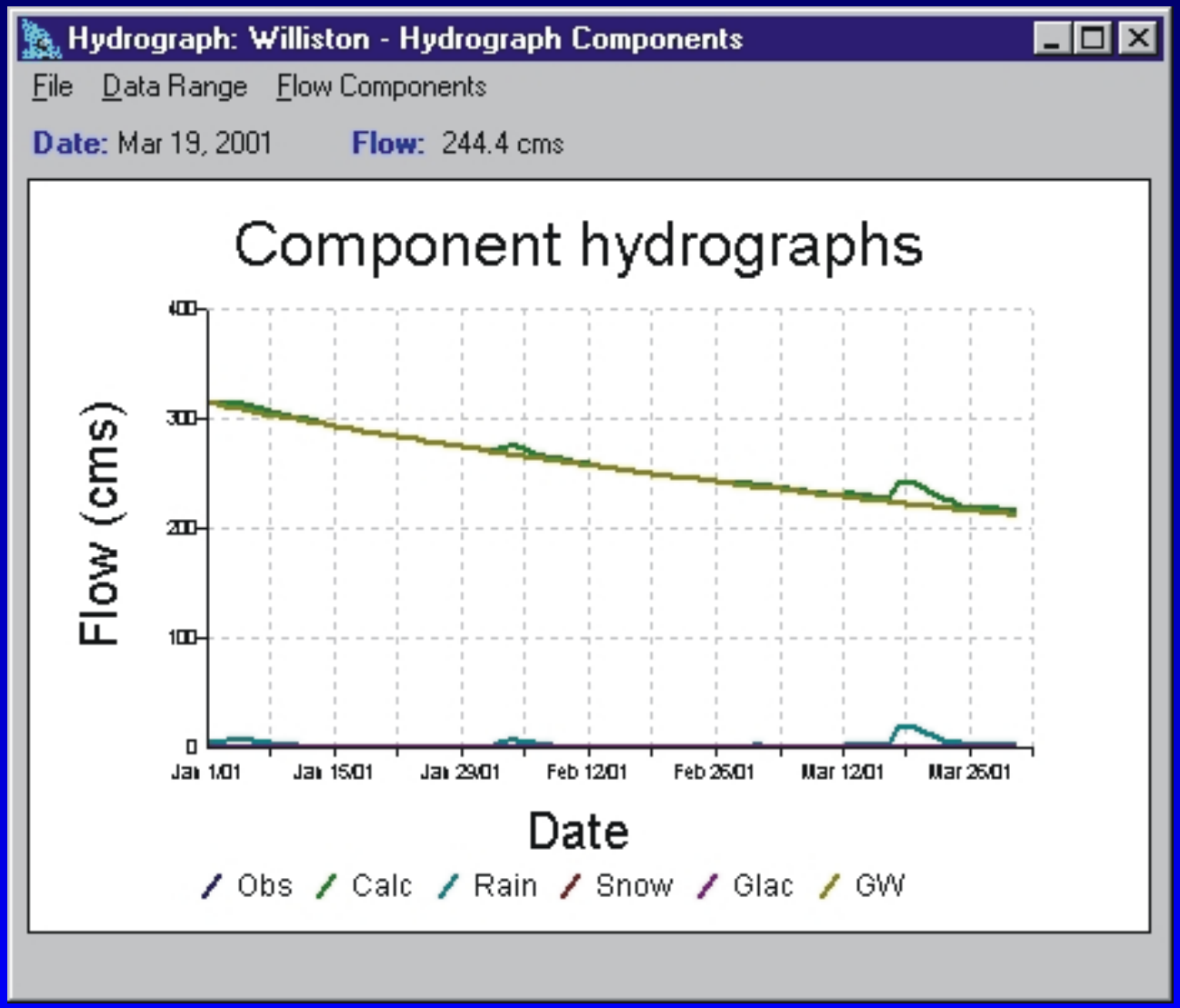
Driving variables

Basin states

Flow components

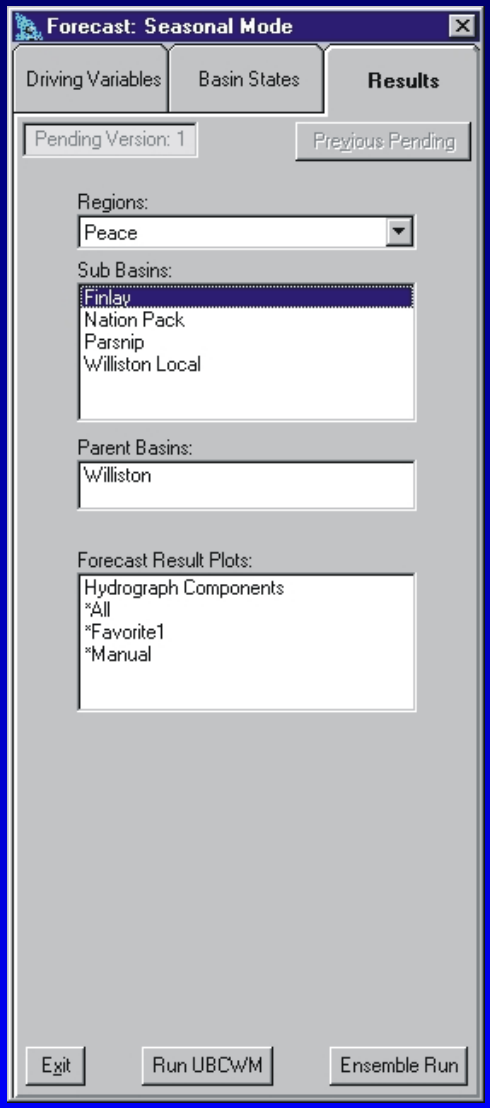


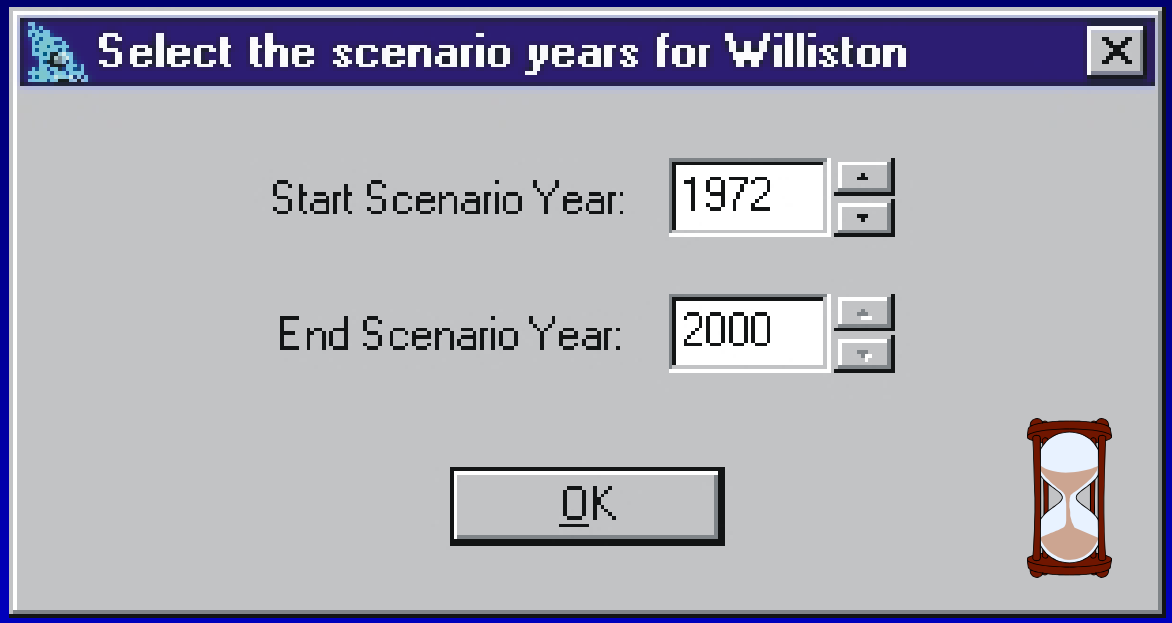
Runoff components



Runoff components

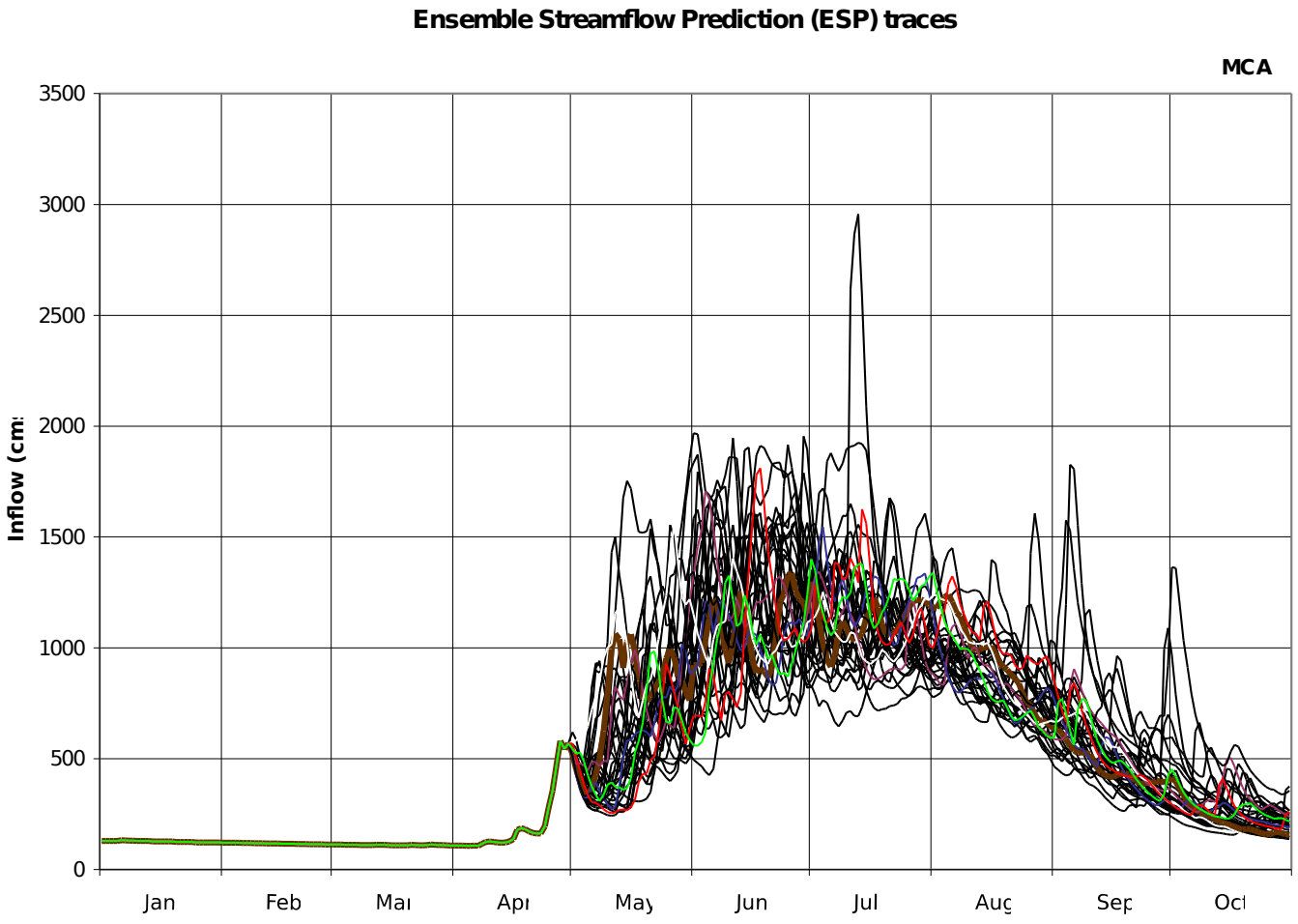
Setting up a forecast run
Tracking run
ESP Run





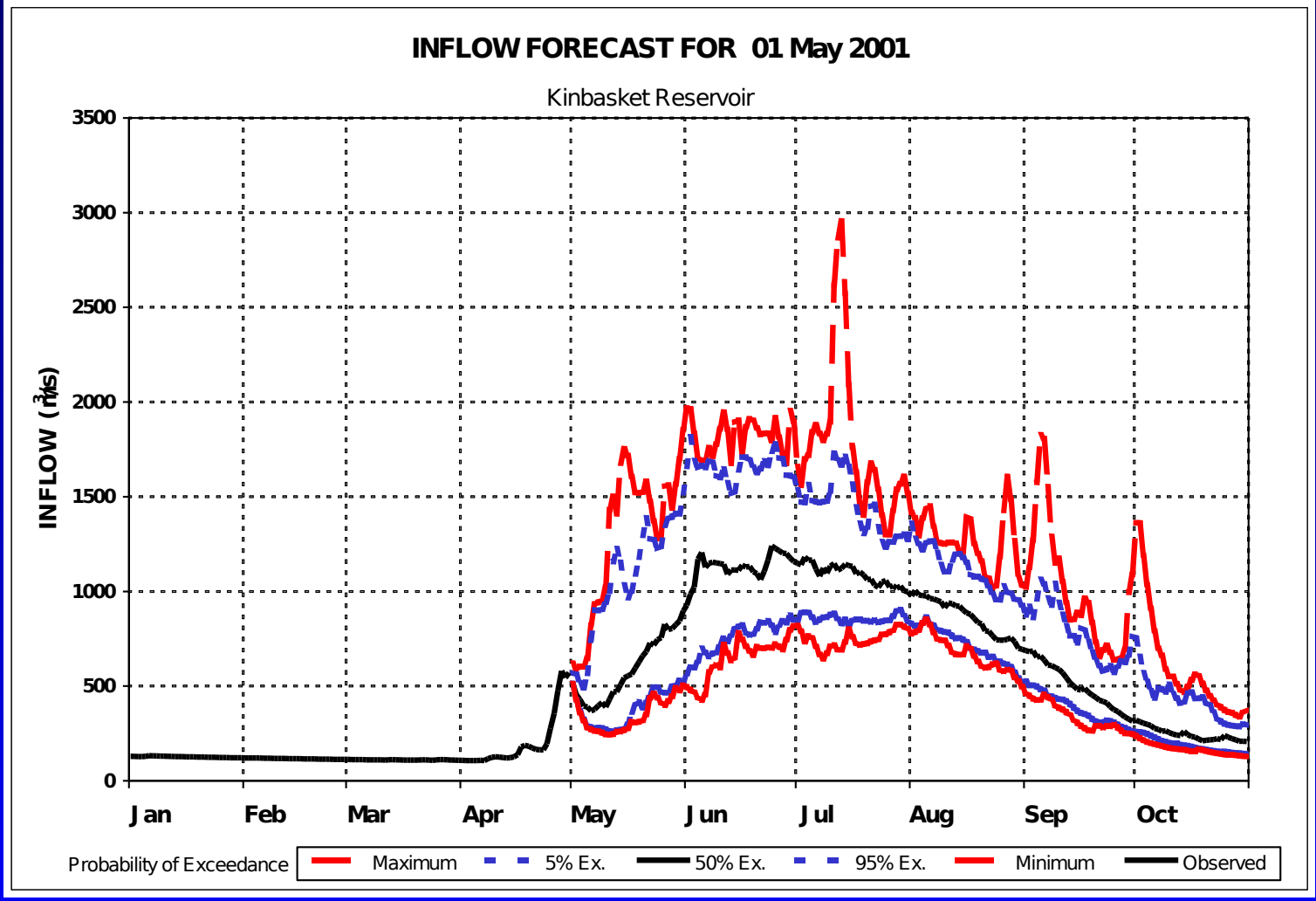
RFS Main menu

Setting up a forecast run
Tracking run
ESP Run



Spaghetti plots

Setting up a forecast run
Tracking run
ESP Run



Probability plot of ESP traces

Setting up a forecast run
Tracking run
ESP Run

May 1, 2001

Remainder of Feb - Sep Runoff Volume (Mil. Cu. M) Watershed: MCA

MIN	11200	10900	10600	10100	8420	5590	3200	973
MAX	13200	12900	12600	12100	10800	8340	5210	2240
MEAN	12600	12300	12000	11500	9740	6730	3740	1370
STD	482	482	482	482	532	604	456	279
NORM	16230	16230	16230	16230	16230	16230	16230	16230
%N	77.6	75.8	73.9	70.9	60.0	41.5	23.0	8.4

YEAR	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1966	11797	11514	11218	10692	8934	6404	3346	1268
1967	12833	12550	12254	11728	10278	6823	3979	1514
1968	12662	12379	12083	11557	9983	6854	3689	1564
1969	12620	12337	12041	11515	9420	5592	3295	1299
1970	12577	12294	11998	11472	9813	6234	3280	1139
1971	12589	12306	12010	11484	9728	6646	4155	1312
1972	12769	12486	12190	11664	10110	6423	3640	1217

- Summary of ESP results by month and season

1998	13217	12934	12638	12112	9525	6738	3901	1417
1999	12480	12197	11901	11375	10129	7405	4198	1374
2000	12142	11859	11563	11038	9536	6977	3662	1365